

CLAIM AMENDMENTS

1. (CURRENTLY AMENDED) A respiratory apparatus for delivering a flow of air to a patient suffering from sleep disordered breathing comprising:

- a blower that generates a flow of pressurized air;
- a patient interface adapted to deliver air from said blower to the patient;
- a display receiving and displaying signals and having a predetermined display range; and
- a control unit coupled to said patient interface and adapted to sense a breathing parameter ~~characteristic of said flow of air~~, said control unit including ~~an~~ a display adjusting circuit means for operating on said breathing parameter to generate a respiration signal indicative of the breathing pattern of the patient; said control unit further including a first averager used to determine a first long term average of said ~~signal~~ breathing parameter, and a second averager used to determine a short term average of said breathing parameter, said display adjusting circuit means adjusting a base line of said breathing parameter in accordance with at least one of said long term and short term averages to restrict said respiration signal to said predetermined display range for restricting said signal within a predetermined display range in response to said first average in a manner that does not change the pressure of the air delivered from the blower to the patient; and

wherein said a display adapted to receives said respiration signal and presents show it said signal within said predetermined range.

2. (ORIGINAL) The respiratory apparatus of claim 1 wherein said control unit includes a pressure sensor adapted to detect a pressure signal indicative of a pressure within said patient interface, said parameter comprising said pressure signal.

3. (CURRENTLY AMENDED) The respiratory apparatus of claim 1 wherein said control unit includes a baseline generator generating a baseline signal corresponding to the baseline of said breathing parameter, said respiration signal being related to said breathing parameter and said baseline signal.

4. (CURRENTLY AMENDED) The respiratory apparatus of claim 3 wherein said baseline generator is coupled to said first averager and has coded control instructions to set said baseline signal to a value related to said first long term average.

5. (CURRENTLY AMENDED) The respiratory apparatus of claim 1 wherein the display adjusting circuit means includes coded control instructions, and wherein ~~said first averager is adapted to generate said first average over a first time period, and wherein said control unit further includes a second averager generating a second average of said signal over a second time period which is much shorter than said first time period, and wherein~~ in accordance with the coded control instructions said display adjusting circuit means adjusts said respiration signal in a first manner dependent on said first long term average in one set of conditions, and adjusts said respiration signal in a second manner dependent on said second short term average in another set of conditions.

6. (CURRENTLY AMENDED) A respiratory apparatus used to provide air under controlled conditions to a patient with a pulmonary deficiency, said respiratory apparatus comprising:

- a blower that generates a flow of pressurized air;
- a patient interface that delivers said flow of air to the patient;
- a display for showing signals, said display having a predetermined display range; and
- a control unit coupled to one of said blower and patient interface to derive a parameter indicative of said flow of air and the breathing of the patient, said control unit having a signal processing unit that processes said parameter to generate a respiration signal indicative of said breathing and a display adjusting circuit means for determining an a long-term average value of said respiration signal parameter and a short-term average value of said parameter and for adjusting a baseline value of said parameter in accordance with at least one of said long-term and short-term average values ~~said respiration signal based on said average value~~ to restrict said respiration signal to a said predetermined display range in a manner that does not change the air treatment delivered from the blower to the patient; and
- a wherein said display adapted to shows said respiration signal within said predetermined range.

7. (CURRENTLY AMENDED) The respiratory apparatus of claim 6 wherein ~~said display adjusting circuit means is adapted to determine a short term average value and a long term average value of said respiration signal based on a short and a long time period, respectively, said display adjusting circuit means being~~ is constructed and arranged to adjust said respiration signal in one of a first manner dependent on said short term average value and a second manner dependent on said long term average value.

8. (PREVIOUSLY AMENDED) The respiratory apparatus of claim 7 wherein said display adjusting circuit is adapted to generate a baseline signal, said baseline signal being subtracted from said parameter to generate said respiration signal.

9. (PREVIOUSLY AMENDED) The respiratory apparatus of claim 8 wherein said display adjusting circuit means is adapted to set said baseline signal to a first value when an absolute difference between said baseline signal and said long term average value exceeds a first threshold.

10. (PREVIOUSLY AMENDED) The respiratory apparatus of claim 9 wherein said display adjusting circuit means is adapted to set said baseline signal to a second value when an absolute difference between said baseline signal and said short term value exceeds a second threshold.

11. (ORIGINAL) The respiratory apparatus of claim 10 wherein said first threshold value is related to said predetermined range.

12. (ORIGINAL) The respiratory apparatus of claim 10 wherein said second threshold value is related to a pressure sustained by a healthy person during a single continuous sustained inspiration or expiration.

13. (CURRENTLY AMENDED) The respiratory apparatus of claim 6 wherein ~~said display adjusting circuit means is adapted to determine a short term average value of said respiration signal based on a short time period~~, said display adjusting circuit means ~~being~~ is constructed and arranged to adjust said respiration signal when the difference between said short term average value and the predetermined threshold exceeds a predetermined threshold value for at least a predetermined duration.

14. (CURRENTLY AMENDED) A method for presenting a respiration signal indicative of the patient's breathing pattern ~~in a respiratory apparatus adapted to provide a flow of pressurized air to a patient on a display having a predetermined display range~~, the method comprising the steps of:

determining a parameter ~~within the device related to the flow of pressurized air and the~~

breathing of the patient;

determining a short term average value of said parameter and a long term average value of said parameter;

generating said respiration signal based on adjusting said parameter based on said respiration signal having a baseline value signal to generate a respiration signal within a predetermined display range based on an average value of said respiration signal; and ;

adjusting said baseline value in accordance with at least one of said long term and short term average values to maintain said respiration signal within said predetermined display range; and

displaying said respiration signal on said display.

15. (CURRENTLY AMENDED) The method of claim 14 further comprising, taking a difference between said baseline ~~signal~~ value and said parameter to derive an adjusted signal.

16. (CURRENTLY AMENDED) The method of claim 15 further comprising determining an absolute difference between said long term average value and said baseline ~~signal~~ value and if said absolute difference is not less than a first threshold, then setting said baseline ~~signal~~ value to said short term average value.

17. (CURRENTLY AMENDED) The method of claim 16 wherein said long term average value is calculated over a period longer than a typical breath of a person.

18. (CURRENTLY AMENDED) The method of claim 17 wherein said long term average value is calculated over a period of about 12 seconds.

19. (ORIGINAL) The method of claim 16 wherein said first threshold is related to said predetermined range.

20. (ORIGINAL) The method of claim 19 wherein said first threshold is a fraction of said predetermined range.

21. (CURRENTLY AMENDED) The method of claim 16 wherein said long term average value is taken over a period which is not longer than a typical breath of a person.

22. (CURRENTLY AMENDED) The method of claim 24 15 wherein said short term average value is taken over a period which is much shorter than a typical breath of a person.

23. (PREVIOUSLY AMENDED) The method of claim 22 wherein the period is about 0.5 sec.

24. (ORIGINAL) The method of claim 23 wherein said first threshold is related to a minimum pressure maintained by a person during a single continuous inspiration or expiration.

25. (CURRENTLY CANCELLED).

26. (CURRENTLY AMENDED) A method of keeping a respiratory signal from a patient within a predetermined dynamic range of an output/display unit comprising the steps of:
determining a respiratory parameter indicative of the patient's respiration; ~~and~~
calculating a relatively long term average of the respiratory parameter
calculating a relatively short term average of the respiratory parameter; and
automatically adjusting a presentation of said respiratory parameter based on a ~~baseline~~
~~signal at least one of said long term and short term averages~~ to generate the ~~respiration~~
respiratory parameter signal within said predetermined dynamic range of ~~an output display unit~~
~~in a manner that does not change the pressure of the air delivered from the blower to the patient.~~

27. (ORIGINAL) The method of claim 26 further comprising automatically adjusting said parameter when said parameter is outside said predetermined range for a predetermined duration.

28. (ORIGINAL) The method of claim 27 wherein said predetermined duration is long compared with the duration of a typical patient inspiration.

29. (ORIGINAL) The method of claim 27 wherein said predetermined duration is long compared with the duration of a typical patient expiration

30. (ORIGINAL) The method of claim 27 wherein said predetermined duration is approximately 6 seconds.

31. (PREVIOUSLY AMENDED) A respiratory apparatus for displaying a respiration signal indicative of a patient's breathing pattern during delivery of airway pressure treatment comprising:

- a pressure transducer to generate a pressure signal proportional to pressure in a patient airway treatment interface, wherein the transducer is coupled to the patient airway treatment interface;

- a processor coupled to receive the pressure signal, wherein the processor includes programmed control instructions, said instructions controlling display adjusting steps for restricting a presentation of a respiration signal within a predetermined display range in a manner that does not change the pressure of the air delivered from the respiratory apparatus to the patient by generating a baseline signal from at least one average of the pressure signal;

- a summer coupled to receive the pressure signal and baseline signal to generate the respiration signal;

- an amplifier coupled to the summer; and

- a display screen coupled to the amplifier to present the respiration signal in the predetermined display range.

32. (PREVIOUSLY PRESENTED) The apparatus of claim 31 wherein the programmed control instructions further control the step of generating the baseline signal by selecting a particular average from a plurality of averages taken over different averaging periods, wherein the selecting of the particular average is a function of a set of conditions.

33. (PREVIOUSLY PRESENTED) The apparatus of claim 32 wherein the set of conditions comprises a threshold comparison of a difference between a current baseline signal and one average from the plurality of averages.

34. (PREVIOUSLY PRESENTED) The apparatus of claim 33 wherein the set of conditions further comprises a time period during which the threshold comparison must be satisfied in the selecting of the particular average.

35. (PREVIOUSLY PRESENTED) The apparatus of claim 1 wherein said control unit is further configured and adapted to control changes in the pressure of the pressurized air.

36. (PREVIOUSLY PRESENTED) The apparatus of claim 6 wherein said control unit is

further configured and adapted to control changes in the pressure of the pressurized air.

37. (CURRENTLY CANCELLED).

38. (CURRENTLY CANCELLED).

39. (PREVIOUSLY PRESENTED) The apparatus of claim 31 further comprising a blower coupled to the processor wherein said processor is configured and adapted to control changes in the pressure of the pressurized air delivered by the blower.

40. (NEW) A respiratory apparatus for delivering a flow of air to a patient suffering from sleep disordered breathing comprising:

- a blower that generates a flow of pressurized air;

- a patient interface adapted to deliver air from said blower to the patient;

- a control unit coupled to said patient interface and adapted to sense a parameter characteristic of said flow of air, said control unit including a display adjusting circuit means for operating on said parameter to generate a signal indicative of the breathing pattern of the patient; said control unit further including a first averager used to determine a first average of said signal, said display adjusting circuit means for restricting said signal within a predetermined display range in response to said first average in a manner that does not change the pressure of the air delivered from the blower to the patient; and

- a display adapted to show said signal;

wherein said first averager is adapted to generate said first average over a first time period, wherein said control unit further includes a second averager generating a second average of said signal over a second time period which is much shorter than said first time period, and wherein said display adjusting circuit means adjusts said signal in a first manner dependent on said first average in one set of conditions, and adjusts said signal in a second manner dependent on said second average in another set of conditions.

41. (NEW) A method for presenting a respiration signal indicative of the patient's breathing pattern in a respiratory apparatus adapted to provide a flow of pressurized air to a patient the method comprising:

- determining a parameter within the device related to the flow of pressurized air and the breathing of the patient;

adjusting said parameter based on a baseline signal to generate a respiration signal within a predetermined display range based on an average value of said respiration signal in a manner that does not change the respiratory treatment delivered to the patient by taking a difference between said baseline and said parameter to derive an adjusted signal;

displaying said adjusted signal; and

determining an absolute difference between said average value and said baseline signal and if said absolute difference is not less than a first threshold, then setting said baseline signal to said average value.

42. (NEW) A method of displaying a respiratory parameter on a display apparatus having a dynamic range, the method comprising the steps of:

monitoring the respiratory parameter

calculating a relatively long term average of the respiratory parameter

calculating a relatively short term average of the respiratory parameter; and

adjusting a baseline value of the respiratory parameter in accordance with at least one of the relatively long term average and the relatively short term average so as to maintain the display of the respiratory parameter within the dynamic range of the display apparatus.

43. (New) A respiratory apparatus for delivering a flow of air to a patient suffering from sleep disordered breathing comprising:

a blower that generates a flow of pressurized air in accordance with a control signal;

a patient interface adapted to deliver air from said blower to the patient;

a display receiving and displaying signals, and having a predetermined display range;

and

a control unit coupled to said patient interface, said control unit generating said control signal and being adapted to sense a parameter characteristic of said flow of air, said control unit including a display adjusting circuit operating on said parameter to generate a separate respiration signal indicative of the breathing pattern of the patient; said control unit further including a first averager used to determine a first average of said respiration signal, said display adjusting circuit restricting said respiration signal within said predetermined display range in response to said first average;

wherein said display receives said respiration signal and presents it within said predetermined range.

44. (New) A respiratory apparatus for delivering a flow of air to a patient suffering from sleep disordered breathing comprising:

- a blower that generates a flow of pressurized air in accordance with a control signal;
- a patient interface adapted to deliver air from said blower to the patient;
- a display receiving and displaying signals and having a predetermined display range; and
- a control unit coupled to said patient interface, said control unit generating said control signal, said control unit further generating a respiration signal indicative of the breathing pattern of the patient, said control unit including an a display adjusting circuit for operating on said respiration signal for restricting said respiration signal within said predetermined display range;

wherein said display receives said respiration signal and presents it within said display predetermined range.